



Designation: **B130—13 B130 – 19**

Standard Specification for Commercial Bronze Strip for Bullet Jackets¹

This standard is issued under the fixed designation B130; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This specification establishes the requirements for commercial bronze strip for manufacture of bullet jacket cups and ammunition components from Copper Alloy UNS No. C22000.²

1.2 ~~Units—Units—The~~The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*³

[B248/B248M](#) Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar
~~B601 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast~~

[B846](#) Terminology for Copper and Copper Alloys

[E3](#) Guide for Preparation of Metallographic Specimens

[E8/E8M](#) Test Methods for Tension Testing of Metallic Materials

[E18](#) Test Methods for Rockwell Hardness of Metallic Materials

[E29](#) Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

[E112](#) Test Methods for Determining Average Grain Size

[E255](#) Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition

[E478](#) Test Methods for Chemical Analysis of Copper Alloys

[E527](#) Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

3. Terminology

3.1 For definition of terms related to copper and copper alloys, refer to Terminology [B846](#).

4. Ordering Information

4.1 Include the following specified choices when placing orders for product under this specification, as applicable:

4.1.1 ASTM designation and year of ~~issue~~issue;

4.1.2 Quantity or weight for each ~~size~~size;

4.1.3 Temper (Section ~~7~~);

4.1.4 Grain size of annealed temper (optional) (Section ~~8~~);

4.1.4 Dimensions: thickness, width, ~~length~~length (Section ~~10~~);

4.1.5 How furnished: straight lengths or ~~coils~~coils.

4.1.7 Heat ~~identification or traceability, when required~~;

4.1.8 Certification, when required, and

4.1.9 Mill test report, when required.

¹ This specification is under the jurisdiction of ASTM Committee [B05](#) on Copper and Copper Alloys and is the direct responsibility of Subcommittee [B05.01](#) on Plate, Sheet, and Strip.

Current edition approved ~~April 1, 2013~~ April 1, 2019. Published ~~April 2013~~ April 2019. Originally approved in 1940. Last previous edition approved in ~~2008~~ 2013 as [B130 – 08](#); [B130–13](#). DOI: [10.1520/B0130-13.10.1520/B0130-19](#).

² Refer to Practice [E527](#) for an explanation of the unified numbering system (UNS).

³ For referenced ASTM standards, visit the ASTM website, [www.astm.org](#), or contact ASTM Customer Service at [service@astm.org](#). For *Annual Book of ASTM Standards* volume information, refer to the ~~standard's~~ standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard

4.1.10 ~~When material is purchased for agencies of the U.S. government, see Section 11.~~

4.2 The following options are available but may not be included unless specified at the time of placing of the order, when required:

4.2.1 Grain size of annealed temper (Section 8),

4.2.2 Heat identification or traceability details,

4.2.3 Certification,

4.2.4 Test report, and

4.2.5 If product is purchased for agencies of the U.S. Government, see Section 11 for additional information, if specified.

5. Materials and Manufacture

5.1 *Material:*

5.1.1 The material of manufacture shall be a form (cast bar, cake, slab, ~~et cetera~~ etc.) of Copper Alloy UNS No. C22000 of such purity or soundness as to be suitable for processing into products prescribed herein.

5.1.2 When specified in the contract or purchase ~~order,~~order that heat identification or traceability is required, the purchaser shall specify the details desired.

NOTE 1—Because of the discontinuous nature of the processing of castings into wrought products, it is not always practical to identify a specific casting analysis with a specific quantity of finished material.

iTeh Standards (<https://standards.itih.ai>) Document Preview

[ASTM B130-19](#)

<https://standards.itih.ai/catalog/standards/sist/b60306d6-da39-44be-bc98-b77a07ed1885/astm-b130-19>

TABLE 1 Chemical Requirements

| Copper Alloy UNS No. C22000 | |
|-----------------------------|-------------|
| Element | Composition |
| Copper | 89.0–91.0 |
| Lead, max | 0.05 |
| Iron, max | 0.05 |
| Bismuth, max | 0.006 |
| Zinc | remainder |

5.2 Manufacture:

5.2.1 The product shall be manufactured by such hot working, cold working, and annealing processes as to produce a uniform wrought structure in the finished product.

5.2.2 The product shall be hot or cold worked to the finished size and subsequently annealed, when required, to meet the temper properties specified in the ordering information.

5.2.3 *Edges*—Slit edges shall be furnished unless otherwise specified in the contract or purchase order.

6. Chemical Composition

6.1 The ~~product~~ material shall conform to the composition ~~prescribed~~ requirements in [Table 1](#).

6.2 These composition limits do not preclude the presence of other elements. By agreement between the manufacturer and purchaser, limits may be established and analysis required for unnamed elements.

6.3 Either copper or zinc may be taken as the difference between the sum of all other elements analyzed ~~determined~~ and 100 %. Copper, when determined by difference, must conform to the requirements of [Table 1](#). When all elements in [Table 1](#) are analyzed, ~~their sum determined~~, the sum of the results shall be 99.8 % min.

7. Temper

7.1 The standard tempers for products described in this specification are given in [Tables 2-4](#):

7.1.1 *Cold-Rolled Tempers*—H01 to H10.

7.1.2 *Annealed Tempers*—OS015 to OS035.

8. Grain Size of Annealed Tempers

8.1 In addition to the tensile properties prescribed in [Table 4](#) for strip, grain size may also be specified by the purchaser. When grain size is specified, the average grain size of the annealed strip shall be within the limits prescribed in [Table 3](#). At a magnification of 75×, the average grain size of selected areas 79.8 mm in diameter of each of two samples of annealed strip shall be determined on a plane parallel to the surface of the strip.

9. Mechanical Property Requirements

9.1 *Tensile Strength of Rolled Tempers*—The tension test shall be the standard test for all tempers of cold-rolled strip, and the acceptance or ~~rejection-rejection~~, based upon mechanical properties, shall depend only on the tensile strength which shall conform to the requirements prescribed in [Table 2](#). Tension test specimens shall be taken so the longitudinal axis is parallel to the direction of rolling.

9.2 *Rockwell Hardness of Rolled Tempers*—Since a Rockwell hardness test offers a quick and convenient method of checking commercial bronze for general conformity to the requirements for tensile strength, the approximate Rockwell hardness values for each of the cold-rolled tempers are given in [Table 2](#) for general information and assistance in testing.

9.3 *Tensile Strength of Annealed Tempers*—The tension test shall be the standard test for all tempers of annealed strip, and the acceptance or rejection, based upon mechanical properties, shall depend only on the tensile strength which shall conform to the requirements prescribed in [Table 4](#). Tension test specimens shall be taken so that the longitudinal axis is parallel to the direction of rolling. When grain size is specified by the purchaser ([8.1](#)), the acceptance and rejection shall be based on both the grain size ([Table 3](#)) and tensile strength ([Table 4](#)).

10. Dimensions, Mass, and Permissible Variations

10.1 *Thickness*—The standard method of specifying thickness shall be in decimal fractions of an inch. The tolerances shall be as shown in [Table 5](#).

TABLE 2 Tensile Strength Requirements and Approximate Rockwell Hardness Values for Cold-Rolled Strip

| Rolled Temper Designation | | Tensile Strength, ksi ^A (MPa ^B) | | Approximate Rockwell Hardness ^C | |
|---------------------------|--------------------|--|----------|--|------------------|
| Standard | Former | Min | Max | B Scale | Superficial 30-T |
| H01 | Quarter-hard | 40 (275) | 50 (345) | 27–56 | 34–54 |
| H02 | Half-hard | 47 (325) | 57 (395) | 50–66 | 50–61 |
| H03 | Three-quarter hard | 52 (360) | 62 (425) | 59–71 | 55–64 |
| H04 | Hard | 57 (395) | 66 (455) | 65–75 | 60–67 |
| H06 | Extra-hard | 64 (440) | 72 (495) | 72–79 | 64–69 |
| H08 | Spring | 69 (475) | 77 (530) | 76–81 | 67–70 |
| H10 | Extra-spring | 72 (495) | 80 (550) | 78–83 | 68–71 |

^A ksi = 1000 psi.

^B See [Appendix X1](#).

^C Rockwell hardness values apply as follows: The B scale applies to metal 0.020 in. (0.058 mm) in thickness and over; the 30-T scale applies to metal 0.012 in. (0.305 mm) in thickness and over.

TABLE 3 Grain Size Requirements of Annealed Strip

| Annealed Temper Designation | Grain Size, mm | | | |
|-----------------------------|----------------|-----------------|--------------|-------|
| | Standard | Nominal Average | Min | Max |
| OS015 | | 0.015 | ^A | 0.025 |
| OS025 | | 0.025 | 0.015 | 0.040 |
| OS035 | | 0.035 | 0.025 | 0.050 |

^A Although no minimum grain size is required, this material must be fully recrystallized.

TABLE 4 Tension Test Requirements of Annealed Strip

| Annealed Temper Designation | Thickness of Annealed Tempers, in. (mm) | Tensile Strength min. ksi ^A (MPa ^B) | Elongation in 2 in. (50.8 mm), min, % |
|-----------------------------|---|--|---------------------------------------|
| OS015 | 0.005 to 0.010 (0.127 to 0.254), incl | 38 (260) | 15 |
| | Over 0.010 to 0.050 (0.254 to 1.27), incl | 38 (260) | 25 |
| | Over 0.050 to 0.100 (1.27 to 2.54), incl | 38 (260) | 27 |
| | Over 0.100 (2.54) | 38 (260) | 30 |
| OS025 | 0.005 to 0.010 (0.127 to 0.254), incl | 36 (250) | 20 |
| | Over 0.010 to 0.050 (0.254 to 1.27), incl | 36 (250) | 30 |
| | Over 0.050 to 0.100 (1.27 to 2.54), incl | 36 (250) | 32 |
| | Over 0.100 (2.54) | 36 (250) | 35 |
| OS035 | 0.005 to 0.010 (0.127 to 0.254), incl | 34 (235) | 25 |
| | Over 0.010 to 0.050 (0.254 to 1.27), incl | 34 (235) | 35 |
| | Over 0.050 to 0.100 (1.27 to 2.54), incl | 34 (235) | 38 |
| | Over 0.100 (2.54) | 34 (235) | 40 |

^A ksi = 1000 psi.

^B See **Appendix X1**

[ASTM B130-19](https://standards.iteh.ai/catalog/standards/sist/b60306d6-da39-44be-bc98-b77a07ed1885/astm-b130-19)

<https://standards.iteh.ai/catalog/standards/sist/b60306d6-da39-44be-bc98-b77a07ed1885/astm-b130-19>

10.2 *Width*—The width tolerances of strip metal shall be as prescribed in **Table 6**.

10.3 *Length*—The strip shall be furnished in straight lengths or in coils (rolls), as specified. Rolls shall consist of not more than three lengths, no one of which shall be less than 10 ft (3.05 m) in length. The tolerances for straight lengths shall be as prescribed in **Table 7**.

10.3.1 *Stock Lengths*—When furnished in stock lengths with short lengths included, the schedule of short lengths shall be as prescribed in **Table 8**.

10.3.2 *Special Length*—When special lengths are required, they shall be specified in the order.

NOTE 2—For the purpose of determining conformance with the dimensional requirements prescribed in this specification, any measured value outside the specified limiting values for any dimension may be cause for rejection.

10.4 *Straightness Tolerances*—The straightness tolerances shall be as prescribed in **Table 9**.

TABLE 5 Thickness Tolerances

| Thickness, in. | Thickness Tolerances, Plus and Minus, ^A in. | | |
|---------------------------|--|----------------------------------|-----------------------------------|
| | 8 in. and under in Width | Over 8 to 14 in., incl. in Width | Over 14 to 20 in., incl. in Width |
| 0.004 and under | 0.0003 (0.008) | 0.0006 (0.015) | ... |
| 0.004 and under | 0.0003 (0.008) | 0.0006 (0.015) | ... |
| Over 0.004 to 0.006, incl | 0.0004 (0.010) | 0.0008 (0.020) | 0.0013 (0.033) |
| Over 0.006 to 0.009, incl | 0.0006 (0.015) | 0.0010 (0.025) | 0.0015 (0.038) |
| Over 0.009 to 0.013, incl | 0.0008 (0.020) | 0.0013 (0.033) | 0.0018 (0.046) |
| Over 0.013 to 0.017, incl | 0.0010 (0.025) | 0.0015 (0.038) | 0.0020 (0.051) |
| Over 0.013 to 0.017, incl | 0.0010 (0.025) | 0.0015 (0.038) | 0.0020 (0.051) |
| Over 0.017 to 0.021, incl | 0.0013 (0.033) | 0.0018 (0.046) | 0.0025 (0.064) |
| Over 0.017 to 0.021, incl | 0.0013 (0.033) | 0.0018 (0.046) | 0.0025 (0.064) |
| Over 0.021 to 0.026, incl | 0.0015 (0.038) | 0.0020 (0.051) | 0.0025 (0.064) |
| Over 0.021 to 0.026, incl | 0.0015 (0.038) | 0.0020 (0.051) | 0.0025 (0.064) |
| Over 0.026 to 0.037, incl | 0.0020 (0.051) | 0.0025 (0.064) | 0.0030 (0.076) |
| Over 0.026 to 0.037, incl | 0.0020 (0.051) | 0.0025 (0.064) | 0.0030 (0.076) |
| Over 0.037 to 0.050, incl | 0.0025 (0.064) | 0.0030 (0.076) | 0.0035 (0.089) |
| Over 0.037 to 0.050, incl | 0.0025 (0.064) | 0.0030 (0.076) | 0.0035 (0.089) |
| Over 0.050 to 0.073, incl | 0.0025 (0.064) | 0.0030 (0.076) | 0.0035 (0.089) |
| Over 0.050 to 0.073, incl | 0.0025 (0.064) | 0.0030 (0.076) | 0.0035 (0.089) |
| Over 0.073 to 0.130, incl | 0.0030 (0.076) | 0.0035 (0.089) | 0.0040 (0.102) |
| Over 0.073 to 0.130, incl | 0.0030 (0.076) | 0.0035 (0.089) | 0.0040 (0.102) |
| Over 0.130 to 0.188, incl | 0.0035 (0.089) | 0.0040 (0.102) | 0.0045 (0.114) |
| Over 0.130 to 0.188, incl | 0.0035 (0.089) | 0.0040 (0.102) | 0.0045 (0.114) |

^A When tolerances are specified as all plus or all minus, double the values given.

TABLE 6 Width Tolerances

| Slit Metal and Slit Metal with Rolled Edges | | | |
|---|--|--|-------------------------------------|
| Width, in. (mm) | Width Tolerances ^A Plus and Minus, in. (mm) | | |
| | 0.004 to 0.032 in. (0.102 to 0.813 mm), incl. in Thickness | Over 0.032 to 0.188 in. (0.813 to 4.78 mm), incl. in Thickness | |
| 2 (50.8) and under | 0.005 (0.13) | 0.010 (0.25) | |
| Over 2 to 8 (50.8 to 203), incl | 0.008 (0.20) | 0.013 (0.33) | |
| Over 8 to 14 (203 to 356), incl | 0.010 (0.25) | 0.015 (0.38) | |
| Over 14 to 20 (356 to 508), incl | 0.013 (0.33) | 0.018 (0.46) | |
| Square Sheared Metal (All Lengths up to 120 in. (3.05 m), incl) | | | |
| Width, in. (mm) | Width Tolerances ^A Plus and Minus, in. (mm) | | |
| | 1/16 in. (1.59 mm) and Under in Thickness | Over 1/16 to 3/8 in. (1.59 to 3.18 mm) incl. in Thicknesses | Over 3/8 in. (3.18 mm) in Thickness |
| 20 (508) and under | 1/32 (0.79) | 3/64 (1.2) | 1/16 (1.6) |

^A When tolerances are specified as all plus or all minus, double the values given.

11. Purchases for the U.S. Government

11.1 When specified in the contract or purchase order, product purchased for agencies of the U.S. Government shall conform to the special government regulations specified in the Supplemental Requirements section as defined in the current issue of Specification **B248/B248M**.

TABLE 7 Length Tolerances for Straight Lengths

NOTE 1—The following length tolerances are all plus; if all minus tolerances are desired, use the same values; if tolerances are desired plus and minus, halve the values given.

| Length, ft (m) | Length Tolerances | |
|--|-------------------|-----------------|
| | in. | mm |
| Length, ft (m) | in. | mm |
| Specific lengths, mill lengths, multiple lengths, and specific lengths with ends | 1/4 | 64 |
| 10 (3.05) and under | | |
| Over 10 to 20 (3.05 to 6.10), incl | 1/2 | 13 |
| Stock lengths and stock lengths with ends | 1 ^A | 25 ^A |
| Stock lengths and stock lengths with ends | 1 ^A | 25 ^A |

^A As stock lengths are cut and placed in stock in advance of orders, departure from this tolerance is not practicable.

12. Workmanship, Finish, and Appearance

12.1 The material shall be free of defects, but blemishes of a nature that do not interfere with normal commercial operations are acceptable. It shall be ~~well-cleaned~~ well cleaned and free of dirt. A superficial film or residual light lubricant is normally present and is acceptable unless otherwise specified.

12.2 The surface finish and appearance shall be the normal commercial quality for the alloy, thickness, and temper ordered. When application information is provided with purchase order, the surface shall be that commercially producible for the application. Superficial films of discoloration, or lubricants, or tarnish inhibitors are permissible unless otherwise specified.

13. Sampling

13.1 *Sampling*—The lot size, portion size, and selection of sample pieces shall be as follows:

13.1.1 *Lot Size*—40 000 lb (18 144 kg) or less material of the same mill form, temper, and thickness, subject to inspection at one time.

13.1.2 *Portion Size*—Sample pieces shall be selected from eight individual pieces and shall be taken so as to be representative of those pieces. If the lot consists of less than eight pieces, a sample shall be taken from each individual piece.

13.2 *Chemical Analysis:*

13.2.1 The sample for chemical analysis shall be taken in accordance with Practice E255 for product in its final form taken from the pieces selected in 13.1.2 and combined into one composite sample. The minimum weight of the composite sample shall be 150 g.

13.2.2 Instead of sampling as directed in 13.2.1, the manufacturer shall have the option of sampling at the time the castings are poured or samples taken from the semifinished product. If the manufacturer determines the chemical composition of the material during the course of manufacture, he shall not be required to sample and analyze the finished product.

13.2.2.1 When samples are taken at the time the castings are poured, at least one sample shall be taken from each group of castings poured from the same source of molten metal.

13.2.2.2 When samples are taken from semifinished product, a sample shall be taken to represent each 10 000 lbs (5000 kg) or fraction thereof, except that no more than one sample shall be required per piece.

13.2.2.3 Only one sample need be taken from the semifinished product of one cast bar from a single melt charge continuously processed.

13.3 *Samples for All Other Tests*—Samples for all other tests shall be taken from the sample portions selected in 13.1.2 and be of a convenient size to accommodate the test and comply with the requirements of the appropriate product specification and test method.

14. Number of Tests and Retests

14.1 *Test:*

14.1.1 *Chemical Analysis:*

14.1.2 When samples are taken at the time the castings are poured, at least one sample shall be analyzed for each group of castings poured simultaneously from the same source of molten metal.

14.1.3 When samples are taken from the semifinished or finished product, at least one sample representative of the product of each cast bar from a single melt charge continuously processed with heat identity maintained shall be analyzed.

14.2 *Mechanical Properties and Grain Size*—Unless otherwise provided in the product specification, test specimens shall be taken from two of the sample pieces selected in accordance with 13.1.2. The required tests shall be made on each of the specimens so selected.